Seminar

Institute for Plasma Research

Title : Why GAMs disappear in H mode?

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Date : 21st December, 2017(Thursday)

Time : 2.00 PM

Venue : Seminar Hall, IPR

Abstract :

Geodesic acoustic mode (GAM), often viewed as finite frequency zonal flow, decorrelates turbulence like zonal shear and mean ExB shear and reduces outward radial transport in tokamak. Zonal flows are well known to trigger L -H transition while the role of GAMs in L H transition is not well understood. GAMs always disappear while L to H transition despite their possibility of strong diamagnetic destabilization due to sharp pressure gradient in H mode. That's the puzzle. H mode is also naturally accompanied by strong mean ExB shear and it's effect on GAM is not well understood. E × B shearing effect on GAM is investigated both as an initial value problem in the shearing frame and as an eigenvalue value problem in the lab frame. The non-trivial effects are that E × B shearing couples the standard GAM perturbations to their complimentary poloidal parities. The resulting GAM acquires an effective inertia increasing in time leading to GAM damping. Eigenmode analysis shows that GAMs are radially localized by E × B shearing with the mode width being inversely proportional and radial wave number directly proportional to the shearing rate for weak shear. A model for transient GAM dynamics including interactions with turbulence, zonal flows and mean flows shear during L-H transition is proposed to explain the physics of GAM disappearance in H mode.